SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions

16. Compare the characteristics of an ideal Op-Amp and a practical Op-Amp.

17. Construct and evaluate a basic astable multivibrator circuit using op-amps to generate a square wave.

18. Design and implement a second-order Butterworth low-pass filter

19. Analyze the key specifications of DACs and ADCs, such as resolution, accuracy, and conversion speed. Discuss how these specifications impact the performance of digital systems.

20. Examine the working of a 4-bit asynchronous binary counter using IC 7493 and discuss its state transitions.

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APRIL/MAY 2025

23PPH13 — LINEAR AND DIGITAL ICs AND APPLICATIONS

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Give any two characteristics of an operational amplifier.

2. Identify the type of feedback used in an inverting amplifier.

3. How Current-to- Voltage (I to V) converter works?

4. Write the differences between a multiplier and a divider circuit.

5. List out the applications of PLL.

6. State the function of a Schmitt trigger in digital circuits.

7. What are the key features of the IC 723 voltage regulator?

8. How does the R-2R ladder DAC work?

9. What is the purpose of IC 74154 in digital circuits?

10. Define Shift Register.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Describe the parameters that define the performance of an Op-Amp.

Or

(b) Compare the working of an inverting amplifier and a non-inverting amplifier

12. (a) Explain the working principle of a Voltage-to-Current (V to I) converter.

Or

(b) Discuss the operation of a comparator and its role in signal processing.

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13. (a) Distinguish between Low pass and High pass filters.

Or

(b) Illustrate the working principle of a Schmitt trigger using an IC 555 timer and explain how hysteresis is achieved.

14. (a) Explain the working principles of a switching, regulator, focusing on their efficiency and design.

Or

(b) Describe the working principle of a successive approximation ADC and discuss its advantages.

15. (a) Create a detailed comparison of IC 74147 (encoder) and IC 7447 (BCD to 7-segmentdecoder), focusing on their applications and functionality.

Or

(b) Distinguish between Multiplexer and Demultiplexer.